



**Communications
Authority of Maldives**



Integrated Services Digital Broadcasting Terrestrial (ISDB-T) Standard for Maldives

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Issue 1.1, February 2019
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Communications Authority of Maldives
Telecom Building
Male', Maldives
www.cam.gov.mv

Integrated Service Digital Broadcasting Terrestrial (ISDB-T) Standard for Maldives

Version History

Issue 1.0, September 2017	-	First version
Issue 1.1, February 2019	-	Inclusion of additional character in Table A8-1-2, Character set for Maldives



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Foreword

This document consists of the followings:

- ISDB-T Standards
- Annex: Details of modifications made to the existing standards
- Appendix: Operational Guideline
- Bibliography

The “ISDB-T Standards” is the standard part for digital terrestrial television broadcasting in Maldives. It is basically compiled based on the ABNT standards yet also incorporating the specifications of the ARIB standards as well as the ISDB-T International Forum Harmonization Documents.

The Annex is the integral part of the standards and covers the details of modifications made to the existing standards.

The Appendix is not the integral part of but supplementary to the standards. It covers the operational guidelines for the general operations at broadcasting stations for digital terrestrial television broadcasting and functional specifications for digital terrestrial television equipment.

Contents

Foreword.....	i
<i>ISDB-T Standards</i>	1
1. Transmission.....	1
2. Video Coding	1
3. Audio Coding.....	1
4. Multiplexing.....	1
5. Service information	1
6. Receiver.....	2
7. Security issues	2
8. Data broadcasting.....	3
9. Interactive channel.....	3
10. EWBS	3
<i>Annex Details of modifications made to the existing standards</i>	4
Annex1 Transmission.....	4
Annex 2 Video coding	12
Annex 3 Audio coding	12
Annex 4 Multiplexing.....	12
Annex 5 Service information	13
Annex 6 Receiver.....	15
Annex 7 Security issue.....	21
Annex 8 Data broadcasting	21
Annex 9 Interactive channel.....	25
Annex 10 EWBS	25
<i>Appendix Operational Guideline</i>	27
Appendix1 Transmission	27
Appendix2 Video Coding	31
Appendix3 Audio Coding	31
Appendix4 Multiplexing	31
Appendix5 Service Information	31
Appendix6 Receiver	34
Appendix7 Security Issues	34
Appendix8 Data broadcasting	34
Appendix9 Interactive channel	41
Appendix10 EWBS	42
Appendix 11 Outline of operational parameters	44
<i>Bibliography</i>	45

ISDB-T Standards

1. Transmission

Parameters are given in Table 1c) of ITU-R BT.1306. For details, ABNT NBR 15601 shall be referred as listed in Appendix 3 to Annex 1 of ITU-R BT.1306. Because ABNT NBR 15601 is the standards for 6 MHz/ch transmission bandwidth, the transmission parameters have been modified for 8 MHz/ch transmission bandwidth as shown here-below. See Annex 1 for details.

- Symbol duration be 6/8 shorter than 6 MHz/ch
- Bandwidth be 8/6 wider than 6 MHz/ch
- IFFT sample clock be 8/6 faster than 6 MHz/ch
- transmission bitrate be 8/6 faster than 6 MHz/ch
- Guard interval length be 6/8 shorter than 6 MHz/ch
- channels be set by every 8MHz and not be used 1/7 MHz frequency shift

2. Video Coding

All the technical parameters related to video coding shall be in accordance with ABNT NBR 15602-1. However, the frame rate of 25 Hz and 50 Hz, and the video format of 576i and 576p shall be supported and video coding parameters for full-seg services are applied to any layers except for the partial reception layer. See Annex 2 for details.

3. Audio Coding

All the technical parameters related to audio coding shall be in accordance with ABNT NBR 15602-2. However, audio coding parameters for full-seg services are applied to any layers except for the partial reception layer.

4. Multiplexing

All the technical parameters related to multiplex shall be in accordance with ABNT NBR 15602-3.

5. Service information

Most of all the technical parameters related to service information shall be in accordance with ABNT NBR15603, however there are some modifications. The main points to be modified are shown here-below. See Annex 5 for the details.

- In order to adopt BML instead of Ginga for the data broadcasting, the descriptors

specifically for Ginga shall be deleted.

- Network ID, Service ID, and Affiliation ID shall be allocated to be respectively unique within Maldives, and Remote Control Key ID shall be allocated to be unique within each of the broadcast service areas.

6. Receiver

While most of all the technical parameters related to receivers shall be in accordance with ABNT NBR15604, there are some modifications required. The main points to be modified are shown here-below. See Annex 6 for the details.

- In order to adopt BML for data broadcasting, some items that are based on Ginga such as the remote control key and the demodulator for data broadcasting shall be modified.
- As the analog video format of Maldives is of PAL-B, those items of PAL-M format shall be replaced to PAL-B.
- The frame rate of 25 Hz and 50 Hz, and the video format of 576i and 576p shall be supported.
- As for the RF INPUT-TERMINAL of the receivers for Maldives, IEC 61169-2 -type terminal (Belling-Lee) should be recommended.
- The priority parameters of the receiver unit of Annex A are described as the operational guidelines, thus it should be subject to ISDB-T Harmonization Document PART 1: Hardware.
- Since there is no detailed specification of "Accessibility resources (Audio location)" in ABNT, it is preferable to remove it.
- Since "Accessibility resources (LIBRAS window)" is a specification unique only to Brazil, it is desirable to remove it.
- Annex B is the information related to GINGA; and it is not necessary to keep it.
- Silicon-Tuner is mostly adopted in the recent TV-Front-End products, making outputs of Low-IF below 10MHz. Thus Low-IF below 10MHz shall also be acceptable. Accordingly, with respect to the frequency conversion, either upper or lower heterodyne conversion shall be acceptable as long as there is no side-effect.
- As for safety standards, it shall be in reference to actual standards in Maldives.

7. Security issues

All the technical parameters related to security issues shall be in accordance with ABNT NBR 15605-1.

8. Data broadcasting

All the technical methods and parameters for BML data broadcasting, subtitle and superimposed characters coding shall be in accordance with ARIB STD-B24.

About the localization for Maldives, the main points to be modified are character set and character coding. See Annex 8 for the details.

Data broadcasting standard is referred also in the receiver standard with respect to remote control requirements. See Annex 6 for the details.

9. Interactive channel

All the technical parameters related to interactive channel shall be in accordance with ABNT NBR 15607-1.

10. EWBS

All the technical methods and parameters shall be in accordance with ISDB-T Harmonization Document PART 3: Emergency Warning Broadcast System (EWBS).

Annex

Details of modifications made to the existing standards

Annex1 Transmission

The details of the modifications from ABNT NBR 15601 are shown in Table A1-1.

Table A1-1 Modifications from ABNT NBR 15601

Section, (Table) No. and item	Page	Original	Modified
6.1 Table 1 — Parameters of the transmission system	6	6000/14 = 428,57 kHz	8000/14 = 571.43 kHz
		5,575 MHz (mode 1) 5,573 MHz (mode 2) 5,572 MHz (mode 3)	7.433 MHz(mode1) 7.431 MHz(mode2) 7.429 MHz(mode3)
		252µs (mode 1) 504 µs (mode 2) 1 008 µs (mode 3)	189 µs (mode 1) 378 µs (mode 2) 756 µs (mode 3)
		Bws/108 = 3,968 kHz (mode 1) Bws/216 = 1,984 kHz (mode 2) Bws/432 = 0,992 kHz (mode 3)	Bws/108 = 5.291... kHz Bws/216 = 2.645... kHz Bws/432 = 1.322... kHz
		63; 31,5; 15,75; 7,875 µs (mode 1) 126; 63; 31,5; 15,75 µs (mode 2) 252; 126; 63; 31,5 µs (mode 3)	47.25, 23.625, 11.8125, 5.90625 µs (mode1) 94.5, 47.25, 23.625, 11.8125 µs (mode2) 189, 94.5, 47.25, 23.625 µs (mode3)
		315; 283,5; 267,75; 259,875 µs (mode 1) 628; 565; 533,5; 517,75 µs (mode 2) 1.260; 1 134; 1 071; 1.039,5 µs (mode 3)	236.25, 212.625, 200.8125, 194.90625 µs (mode1) 472.5, 425.25, 401.625, 389.8125 µs (mode2) 945, 850.5, 803.25, 779.625 µs(mode3)

Section, (Table) No. and item	Page	Original	Modified
6.1 Principal parameters	6	Further, pilot signal shall added to data segment in the OFDM framing section to form an OFDM segment (with a bandwidth of 6/14 MHz).	Further, pilot signal shall be added to data segment in the OFDM framing section to form an OFDM segment (with a bandwidth of 8/14 MHz).
	7	Up to three hierarchical layers may be transmitted in a 6 MHz channel.	Up to three hierarchical layers may be transmitted in an 8 MHz channel.
6.1 Table 2 — OFDM segment parameters	8	Table 2 — OFDM-segment parameters	ARIB STD-B31 Version2.2-E1 Page84 Table A-5: ODFM Segment Parameters (8 MHz Bandwidth System)
6.1 Table 3 — Transmission signal parameters	9	Table 3 — Transmission signal parameters	ARIB STD-B31 Version2.2-E1 Page85 Table A- 6: Transmission Signal Parameters (8 MHz Bandwidth System)
6.1 Table 4 — Data rate of a single segment	10	Table 4 — Data rate of a single segment	ARIB STD-B31 Version 2.2-E1 Page86 Table A- 7: Data Rate per a Single Segment (8 MHz Bandwidth System)
6.1 Table 5 — Total data rate	11	Table 5 — Total data rate	ARIB STD-B31 Version2.2-E1 Page87 Table A- 8: Total Data Rate*1 (8 MHz Bandwidth System)

Section, (Table) No. and item	Page	Original	Modified
6.14.4 Table 25 — Examples of transmission capacities for AC carriers (mode1, guard interval of 1/8)	43	Table 25 — Examples of transmission capacities for AC carriers (mode1, guard interval of 1/8)	See Table A1-2 for Examples of transmission capacities for AC carriers (mode1, guard interval of 1/8)
6.15.1 Position of the segments within the 6 MHz spectrum	43	6.15.1 Position of the segments within the 6 MHz spectrum	6.15.1 Position of the segments within the 8 MHz spectrum
7.1 Frequency bandwidth	51	A frequency bandwidth of 5.7 MHz shall be used for digital terrestrial television broadcasting.	A frequency bandwidth of 7.6 MHz shall be used for digital terrestrial television broadcasting.
		The frequency bandwidth shall be 5.7 MHz when the OFDM carrier bandwidth is 5.572 MHz with 4 kHz spacing between carrier frequencies in Mode 1. This bandwidth shall apply regardless of which mode is chosen, and has been selected to ensure that the bandwidth of 5.610 MHz has some margin to determine that each carrier of the uppermost and lowermost in the 5.572..MHz bandwidth includes 99 % of energy.	The frequency bandwidth shall be 7.6 MHz when the OFDM carrier bandwidth is 7. 433 MHz with 5.291 kHz spacing between carrier frequencies in Mode 1. This bandwidth shall apply regardless of which mode is chosen, and has been selected to ensure that the bandwidth of 7. 480 MHz has some margin to determine that each carrier of the uppermost and lowermost in the 7.433..MHz bandwidth includes 99 % of energy.

Section, (Table) No. and item	Page	Original	Modified
7.3 Frequency offset of the OFDM carriers	52	The frequency of the terrestrial transmission signal shall have a positive offset of 1/7 MHz (142.857 kHz) in relation to the channel central carrier to be used in the current channel allotment plan (see Figure 37).	Offset not be used.
		Table 39 — High VHF channels	High VHF channels not be used.
	53	Table 40 — UHF channels	See table A1-3 for 8 MHz/ch UHF channels
7.4 IFFT sampling frequency and permissible deviation	54	The IFFT sampling frequency for use with OFDM for digital terrestrial television broadcasting shall be as follows: $F_s = 512/63 \text{ MHz} = 8\,126\,984 \text{ Hz}$	The IFFT sampling frequency for use with OFDM for digital terrestrial television broadcasting shall be as follows: $F_s = 2048/189 \text{ MHz} = 10\,835\,978 \text{ Hz}$
		The permissible deviation is $\pm 0.3 \text{ Hz/MHz}$.	The permissible deviation is $\pm 0.2 \text{ Hz/MHz}$.
		An IFFT sampling frequency of 512/63 MHz, a theoretical sample frequency, may be used if the permissible deviation requirement is met.	An IFFT sampling frequency of 2048/189 MHz, a theoretical sample frequency, may be used if the permissible deviation requirement is met.

Section, (Table) No. and item	Page	Original	Modified
7.5.1 Characteristics of the transmission spectrum mask	54	7.5.1 Characteristics of the transmission spectrum mask The out-of-band spectrum level allocated for broadcasting the television signal shall be reduced applying a proper filtering. Figure 38 and Table 41 indicate the minimum attenuation and the out-of-band emission in relation to the transmitter average power, specified in relation to the spacing of the signal central carrier, for critical, sub-critical and non-critical mask.	7.5.1 Characteristics of the spectrum limit mask The out-of-band spectrum level allocated for broadcasting the television signal shall be reduced applying a proper filtering. Figure A1-1 and Table A1-4 indicate the spectrum limit mask for sensitive and non-critical mask, where the relative power level is defined in a reference bandwidth of 4 kHz with the 0 dB reference level corresponding to the mean output power measured in the channel bandwidth as described in ITU-R Recommendation BT.1206-1.
	54	Figure 38 — Transmission-spectrum limit masks for digital terrestrial television broadcasting	See Figure A1-1 for 8 MHz/ch Spectrum limit masks
	55	Table 41 — Specification of the transmission spectrum mask	See Table A1-4 for 8 MHz/ch break points
		The values of Table 41 shall be measured with a spectrum analyzer configured according to Table 42. Table 42 Spectrum settings for mask measurement The cut point shall be measured using a spectrum analyzer adjusted for a 20 MHz span frequency or lower and a 10 kHz bandwidth resolution (RBW).	Deleted. It is not necessary to specify the method to measure them.

Section, (Table) No. and item	Page	Original	Modified
7.5.2 Criteria for applying masks	55	Application of masks shall take in account the class of the stations and substations. Digital stations are classified in ...	Two spectrum masks are specified in Fig. A1-1 and the associated Table A1-4. The upper curve defines the spectrum mask for the non-critical cases and the lower curve defines the spectrum mask for the sensitive cases as described in ITU-R Recommendation BT.1206-1.
	56	Table 43 — Maximum power of each class	VHF high not be used.
7.6 Table 45 — Allowable spurious emission power	56	Table 45 — Allowable spurious emission power	See Table A1-5 for Allowable spurious emission power as described in RR Appendix 3 or ITU-R SM.329.

Table A1-2 Examples of transmission capacities for AC carriers (mode 1, guard
interval of 1/8) (See Table A1-1 Column 6.14.4 Table 25)

	Synchronous modulation's segment		Differential modulation's segment	
	1	13	1	13
AC1	9,4 kbps	121,7 kbps	9,4 kbps	121,7 kbps
AC2	-	-	18,7 kbps	243,4 kbps

Table A1-3 8 MHz/ch UHF channels (See Table A1-1 Column 7.3 Frequency offset of the OFDM carriers)

Channel	Start Frequency (MHz)	End Frequency (MHz)	Center Frequency (MHz)
21	470	478	474
22	478	486	482
23	486	494	490
24	494	502	498
25	502	510	506
26	510	518	514
27	518	526	522
28	526	534	530
29	534	542	538
30	542	550	546
31	550	558	554
32	558	566	562
33	566	574	570
34	574	582	578
35	582	590	586
36	590	598	594
37	598	606	602
38	606	614	610
39	614	622	618
40	622	630	626
41	630	638	634
42	638	646	642
43	646	654	650
44	654	662	658
45	662	670	666
46	670	678	674
47	678	686	682
48	686	694	690

Figure A1-1: Transmission spectrum limit masks for 8 MHz (See Table A1-1 Column 7.5 Transmission spectrum mask)

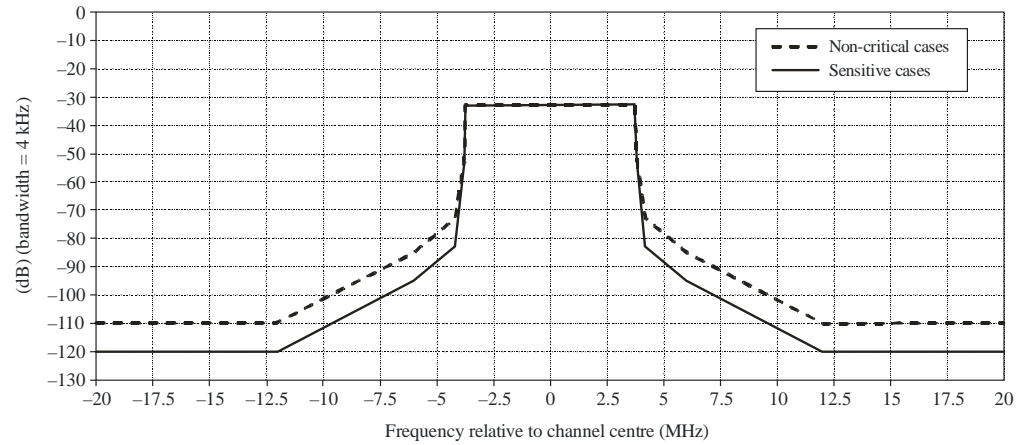


Table A1-4: Break points corresponding to Figure A1-1 (See Table A1-1 Column 7.5 Specification of the transmission spectrum mask)

Frequency relative to the center of the 8 MHz channel (MHz)	Relative level in a 4 kHz measurement bandwidth (dB)	
	Non-critical emission mask	Sensitive cases
-20	-110	-120
-12	-110	-120
-6	-85	-95
-4.2	-73	-83
-3.81	-52.7	-52.7
-3.72	-32.7	-32.7
+3.72	-32.7	-32.7
+3.81	-52.7	-52.7
+4.2	-73	-83
+6	-85	-95
+12	-110	-120
+20	-110	-120

Table A1-5: Allowable spurious emission power (See Table A1-1 Column 7.6 Table 45 — Allowable spurious emission power)

Separation in relation to the digital signal central carrier	Attenuation (dB) below the power supplied to the antenna transmission line
> 20 MHz	46+10 log (P), or 60 dBc, whichever is less stringent, without exceeding the absolute mean power level of 12 mW for UHF stations. However, greater attenuation may be necessary on a case by case basis.
< - 20 MHz	

Annex 2 Video coding

The details of the modifications from ABNT NBR 15602-1 are shown in Table A2-1. Video coding parameters for full-seg services shown in Table A2-2 are applied to any layers except for the partial reception layer.

Table A2-1 Modifications from ABNT NBR 15602-1

Section No. and item	Page	Original	Modified
5.4 Parameters for video signals	4	NOTE See ITU Recommendation BT.709-5 and ITU Recommendation BT.601-5.for additional information.	NOTE Table 5 to 14 and Figures 1 to 13 are for 60 Hz field frequency. See ITU Recommendation BT.709-5 and ITU Recommendation BT.601-5.for 50 Hz field frequency. Video coding parameters for Full-Seg services should meet the parameters indicated in Table A2-2.
8.3.1 General specifications	25	5 Hz, 10 Hz, 12Hz, 15 Hz, 24 Hz, 30Hz	5 Hz, 10 Hz, 12 Hz, 15 Hz, 24 Hz, 25 Hz, 30 Hz

Table A2-2: Video coding parameters for Full-Seg services

Number of horizontal pixels	Number of vertical pixels	Frame rate [Hz]	Scanning system	Aspect ratio	Profile and level
720	576	25	Interlaced	4:3 16:9	H.264|MPEG-4 AVC HP@L3
720	576	50	Progressive	16:9	H.264|MPEG-4 AVC HP@L3.1
1280	720	50	Progressive	16:9	H.264|MPEG-4 AVC HP@L4
1920	1080	25	Interlaced	16:9	H.264|MPEG-4 AVC HP@L4
1920	1080	25	Progressive	16:9	H.264|MPEG-4 AVC HP@L4

Annex 3 Audio coding

There is no amendment to ABNT 15602-2. However audio coding parameters for full-seg services are applied to any layers except for the partial reception layer.

Annex 4 Multiplexing

There is no amendment to ABNT 15602-3

Annex 5 Service information

The details of the modifications from ABNT NBR 15603-1, 15603-2 and 15603-3 are shown in Table A5-1, A5-2 and A5-3, respectively.

Table A5-1 Modification from ABNT NBR 15603-1

Section No. and item	Page	Original	Modified
6.1 PID used for tables transmission	8	... specified by the Brazilian Ministry of Communications or signal of broadcasters.	... specified by signal of broadcasters.

TableA5-2 Modifications from ABNT NBR 15603-2

Section No. and item	Page	Original	Modified
8.1 Table 26: Location and requirements of SI descriptors	45	- Carousel ID descriptor - Association tag descriptor - Deferred association tag descriptor	Deleted Deleted Deleted
8.3.4 Component descriptor	49	Table 28	Add video formats described in table A5-4 to Table 28.
8.3.30 Video decode control descriptor	80	Table 66 — Video encoding format	Add video encoding format as described in Table A5-5.
8.3.31 Terrestrial delivery system descriptor	80	$(473 + 6 \times (X - 14) + 1/7) \times 7 = (xxx)d$	$(474 + 8 \times (X - 21)) \times 7 = (xxx)d$
Annex E: Area_code specification	116 117	(Whole of Annex E)	Assignment of area_code is in compliance with Appendix 10 in this document
Annex G Specification for tuning physical and logical channel	120	- 6MHz	- 8MHz
Annex H.2: Original_network_id	122	(Whole of Annex H.2)	Refer to Annex A5-1 in this document about the structure of original_network_id.
3.2 8.3.21 Annex A Annex I.1: Annex I.6	3 61 103 124 126	- Brazilian - Brazil	- Maldivian - Maldives
7.2.7.1 7.2.8 7.2.9.1 7.2.12 8.3.25 Annex A	28 29 30 35 67 103	- Brazil (UTC-3) - UTC-3	- Maldives (UTC+5) - UTC+5
8.3.4 8.3.7	48 52	EXAMPLE Portuguese, Brazilian official language,	EXAMPLE English has 3-character code "eng", which

Section No. and item	Page	Original	Modified
8.3.15	59	has 3 coded characters "por", which is coded as: "0111 0000 0110 1111 0111 0010".	is coded as: "0110 0101 0110 1110 0110 0111", and Divehi has 3-character code "div", which is coded as: "0110 0100 0110 1001 0111 0110".
8.3.6	52	EXAMPLE Brazilian country	EXAMPLE Maldivian country
8.3.11	55	has 3 character code "BRA",	has 3 character code "MDV",
8.3.25	67	which is coded as: "0100	which is coded as: "0100 1101
8.3.26	69	0010 0101 0010 0100 0001"	0100 0100 0101 0110"

Table A5-3 Modifications from ABNT NBR 15603-3

Section No. and item	Page	Original	Modified
8.2.2	15	- UTC-3	- UTC+5
8.2.6	19		
8.2.6 Table 13	19		
B.1.4.3	30		
B.5	50		
8.2.5 Short node information descriptor	17	EXAMPLE Portuguese, Brazilian official language, has 3 coded characters "por", which is coded as: "0111 0000 0110 1111 0111 0010".	EXAMPLE English has 3-character code "eng", which is coded as: "0110 0101 0110 1110 0110 0111", and Divehi has 3-character code "div", which is coded as: "0110 0100 0110 1001 0111 0110".
B.1.4.3	30	- Brazilian	- Maldivian
B.2.7	42		

Table A5-4 Stream content and component type (additional items)

(See Table A5-2 Column 8.3.4 Component descriptor)

Stream content	Component type	Description
0x05	0x05	H264/AVC video 625i (576i), 4:3 aspect ratio
0x05	0x06	H264/AVC video 625i (576i), 16:9 aspect ratio with pan vectors
0x05	0x07	H264/AVC video 625i (576i), 16:9 aspect ratio without pan vectors
0x05	0x08	H264/AVC video 625i (576i), > 16:9 aspect ratio
0x05	0xA5	H264/AVC video 625p (576p), 4:3 aspect ratio
0x05	0xA6	H264/AVC video 625p (576p), 16:9 aspect ratio with pan vectors
0x05	0xA7	H264/AVC video 625p (576p), 16:9 aspect ratio without pan vectors
0x05	0xA8	H264/AVC video 625p (576p), > 16:9 aspect ratio

Table A5-5 Video encoding format
(See Table A5-2 Column 8.3.30 Video decode control descriptor)

Video encoding format	Description
0000	1080p
0001	1080i
0010	720p
0011	480p or 576p
0100	480i or 576i
0101	240p
0110	120p
0111	Reserved
1000	180p
1001-1011	Reserved
1100-1111	For video encoding format extension

A5-1 Original_network_id (See Table A5-2 Column Annex H.2:Original_network_id)

Refer to Figure A5-1 about the structure of original_network_id.

Original_network_id

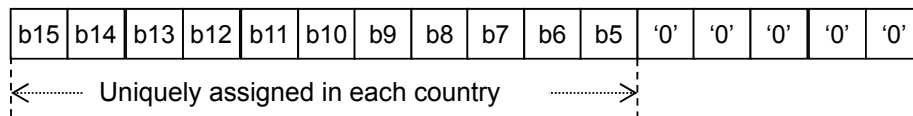


Figure A5-1 Structure of original_network_id

Annex 6 Receiver

The details of the modifications from ABNT NBR 15604 are shown in Table A6-1.

Table A6-1 Modifications from ABNT NBR 15604

Section No. and item	Page	Original	Modified
Contents	v, vi	Annex B (normative) Priority parameters of middleware Ginga Annex C (normative) Measurement method C.1 Sensitivity C.2 Selectivity (protection ratio)	Deleted

Section No. and item	Page	Original	Modified
4 5.2 Figure 2: 7.2.27.7	6 8 22	- PAL-M - Standard: M	- PAL-B - Standard: B
6: Environment and safety conditions	10	Environment and safety conditions	About safety regulations, it shall be in reference to actual standards in Maldives.
7.1: Reception antenna	12	a) the antenna shall allow the reception of digital terrestrial television signals that are comprehended between VHF channels from 07 to 13 and the UHF channels from 14 to 69, for the fixed and mobile (full-seg) receivers and at least the channels comprehended in the UHF band between the channels 14 to 69 for the portable (one-seg) receivers;	a) the antenna shall allow the reception of digital terrestrial television signals that are comprehended between the UHF channels from 21 to 48;
		b) optionally, the antenna may yet allow the reception of analog terrestrial television signals that are comprehended between the VHF channels from 02 to 13 and UHF from 14 to 62;	Deleted
7.2.1.1 7.2.1.2	12	type F	type IEC 61169-2
7.2.2.1: Fixed or mobile (full-seg) reception devices	13	The receiver unit shall be able to tuning television channels limited by the VHF high band, comprehended between the channels 07 to 13 and the receiver unit shall be able to tuning the television channels limited by the UHF band, comprehended between the channels 14 to 69.	The receiver unit shall be able to tuning the television channels limited by the UHF band, comprehended between the channels 21 to 48.
7.2.2.2: Portable devices for partial reception (one-seg)	13	The partial reception unit shall be able to tuning, at least, the television channels limited by the UHF band, comprehended between the channels 14 to 69.	The partial reception unit shall be able to tuning, at least, the television channels limited by the UHF band, comprehended between the channels 21 to 48.
		The VHF high band channels reception is optional in the portable receivers (one-seg).	Deleted
7.2.3 Channel bandwidth	13	a) fixed or mobile (full-seg) reception devices: 5.7 MHz; b) portable (one-seg) devices: 0.43 MHz.	a) fixed or mobile (full-seg) reception devices: 7.6 MHz; b) portable (one-seg) devices: 0.58 MHz.

Section No. and item	Page	Original	Modified
7.2.4: Table 3 – Frequencies of channels of UHF band	13	Table 3 – Frequencies of channels of UHF band	See Table A1-3 for 8 MHz/ch UHF channels
7.2.5: Sensitivity	16	a) minimum antenna signal input level: - 77 dBm or lower, as shown in Annex C, subclause C.1. b) maximum antenna signal input level: equal or higher than - 20 dBm;	a) minimum antenna signal input level: - 78.4 dBm or lower; b) maximum antenna signal input level: equal or higher than 0 dBm;
7.2.6: Selectivity – Protection ratio	16	The measurement method is demonstrated in Annex C.	Deleted
7.2.7: First intermediate frequency (IF)	16	The central frequency of the IF shall be of 44 MHz, and optionally direct conversion in base band. The local oscillator frequency shall be located at the upper side of the received frequency.	The central frequency of the IF shall be of 36 MHz, and optionally direct conversion in base band. Low-IF under 10 MHz is also acceptable such as for Silicon-Tuner use. As for frequency conversion, either upper or lower heterodyne conversion is acceptable as long as there is no side-effect.
7.2.10.1 Figure 5	17	44MHz or base band	36 MHz or base band
7.2.10.2 Figure 6	18		
7.2.21: Primary data decoder	20	The porting of middleware Ginga is optional; however when it is embedded in the receiver, the minimum requirements defined in Table B.1 shall necessarily to be implemented (see Clause 9).	All the technical methods and parameters for BML data broadcasting shall be in accordance with ARIB STD-B24.
7.2.24: Accessibility	21	c) locution;	"Locution" specification is not necessary since there is no detail in ABNT.
	21	e) LIBRAS window.	"LIBRAS window" is a unique item to Brazilian standard. So it is not necessary.
7.2.27.1	21	"F" type	"IEC 61169-2" type
7.2.27.1	21		
7.2.27.7: RF Output	22	according to Clause 8, Table 9.	according to Clause 8, Table 10.
7.2.28: Remote control	22	7.2.28 Remote control	See Table A6-2 for remote control keys used for data broadcasting; and Fig A6-1 for examples of remote controllers.

Section No. and item	Page	Original	Modified
8.1.4.2: Full-seg receiver	26	The full-seg receivers shall support at least the video decoding in the 525i, 525p, 750p and 1125i formats, according to the specified in the ABNT NBR 15602-1.	The full-seg receivers shall support at least the video decoding in the 576i, 576p, 720p, 1080i and 1080p formats.
8.1.4.4: Full-seg receiver with support to the one-seg exhibition	26	Table 8 – Resolutions which shall be supported	See Table A6-3 for resolutions which shall be supported.
8.1.5.1 Full-seg receivers	26	The full-seg receivers shall at least support the frames rate of 30/1.001 Hz and 60/1.001 Hz.	The full-seg receivers shall at least support the frames rate of 25 Hz and 50 Hz.
8.1.5.2 One-seg receiver	26	The one-seg receivers shall at least support the frames rate 5fps, 10fps, 12fps, 15fps, 24fps and 30fps	The one-seg receivers shall at least support the frames rate 5fps, 10fps, 12fps, 15fps, 24fps, 25fps and 30fps
8.1.6.1: Full-seg receivers type digital converter	27	8.1.6.1 Full-seg receivers type digital converter The digital converter receiver (set-top box) shall have a RCA connector, 75 Ω , for composite video 525i output encoded in PAL-M. The video signal with the specified configuration shall be always present independently of the encoder parameters of a video pertaining to a stream received for decoding. This requirement is optional for integrated receivers with display, fixed or portable.	8.1.6.1 Full-seg receivers type digital converter The digital converter receiver (set-top box) shall have an RCA connector, 75 Ω , for composite video 625i output encoded in PAL-B. The video signal with the specified configuration shall always be present independently of the encoder parameters of a video pertaining to the stream received for decoding. This requirement is optional for integrated receivers with display, fixed or portable.
8.1.7 Analog video output	27-29	8.1.7 Analog video output	Deleted
9: Primary data decoding	34	9 Primary data decoding	About Data broadcasting, all the technical methods and parameters for BML shall be in accordance with ARIB STD-B24.
11.3 Semantics for parental rating descriptor	35	EXAMPLE Brazilian country has 3 character code "BRA", which is coded as: "0100 0010 0101 0010 0100 0001"	EXAMPLE Maldivian country has 3 character code "MDV", which is coded as: "0100 1101 0100 0100 0101 0110"
11.4 Cases in which the receiver shall not block the event	36	"BRA" (0x425241)	MDV"=0x4D4456

Section No. and item	Page	Original	Modified
12: Accessibility resources	39	Portuguese	English and Divehi
	39	c) Audio locution	"Locution" specification is not necessary since there is no detail in ABNT.
	39	e) LIBRAS window	"LIBRAS window" is an item unique to Brazilian standard. So it is not necessary.
14.1.2: Full-seg receiver	42	It is optional for the full-seg receivers manufacturers the implementation of the USB port, since such equipment do not have interactivity channel, even if the middleware Ginga is embedded on them.	It is optional for the full-seg receiver manufacturers to provide the USB port.
Annex A: Priority parameters of the receiver unit	47	In Table A.1	In "ISDB-T HARMONIZATION DOCUMENT PART 1: HARDWARE" (NOTE)
	48 -57	Table A.1	Deleted
Annex B: Priority parameters of middleware Ginga	58-62	Annex B Priority parameters of middleware Ginga	Deleted
Annex C(normative) Measurement method	63-64	Annex C(normative) Measurement method	Deleted

(NOTE) The "ISDB-T HARMONIZATION DOCUMENT PART 1: HARDWARE" doesn't correspond to 8MHz system. Japan is ready to propose the modifications to include 8MHz system for the next ISDB-T International Forum.

Table A6-2 Remote control keys used for data broadcasting
(See Table A6-1 Column 7.2.28: Remote control)

Key type	Guidelines
↑、↓、←、→ (up, down, left, right keys)	To move up, down, left, right.
0 - 9 (number keys)	To input numbers
Confirm	Separator of operation (enter)
Back	Cancel operation
	Back space of user input character (or bulk erase)

Key type	Guidelines
	<p>Disconnection of a call to a communication server</p> <p>(*)During connection, receiver units will take the instruction; after connection, instruction is carried out in the contents. (A display to the effect that the connection will be terminated is desirable when the back key is pressed.)</p> <p>(*)It is okay to use BML documents for the purpose of going back. However, whether or not there is something after returning should be considered.</p>
Data	<p>Switches display/non-display of multi-media data broadcasting.</p> <p>(*)Separated "Data" button is recommended.</p>
Red, green, yellow, and blue (color keys)	<p>Selection of operation (execution)</p> <p>(*)Location of buttons on the remote control should be in order of red, green, yellow, blue from the left.</p>
Bookmark (Optional)	Recording of bookmark.

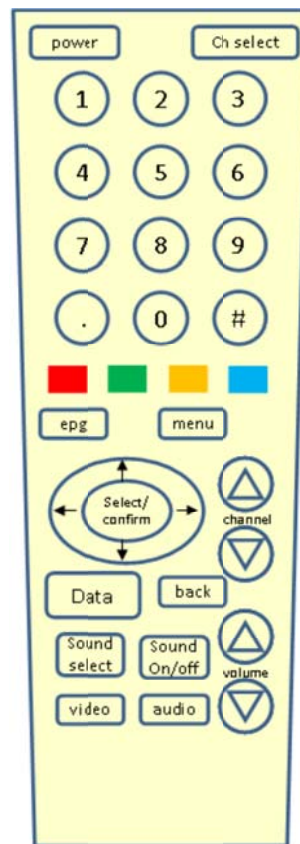


Fig A6-1 Example of Remote Controller
(See Table A6-1 Column 7.2.28: Remote control)

Table A6-3 Resolutions which shall be supported

Output video format	Aspect ratio	Number of lines to be decoded	Aspect ratio info	Output video format	Aspect ratio	Number of lines to be decoded	Aspect ratio idc
SQVGA	4:3	160 x 120	1	576i	4:3	720 x 576	2
SQVGA	16:9	160 x 90	1	576i	16:9	720 x 576	4
QVGA	4:3	320 x 240	1	576p	16:9	720 x 576	4
QVGA	16:9	320 x 180	1	720p	16:9	1280 x 720	1
CIF	4:3	352 x 288	2	1080i	16:9	1920 x 1080	1
				1080p	16:9	1920 x 1080	1

Annex 7 Security issue

There is no amendment to ABNT NBR 15605-1.

Annex 8 Data broadcasting

All the technical methods and parameters for BML data broadcasting, subtitle and superimposed characters coding shall be in accordance with ARIB STD-B24.

ARIB STD-B24 includes the usage of UCS (Universal multi-octet coded character set) and UTF-8 (UCS Transformation Format—8-bit) in it, yet it is intended for the usage in Japan only. Therefore for the usage in Maldives, some modifications are needed.

A8-1 Modifications for BML data broadcasting

The details of the modifications from ARIB STD-B24 necessary for BML data broadcasting in Maldives are shown in Table A8-1-1.

Table A8-1-1 Modifications from ARIB STD-B24 (BML data broadcasting)

Section No. and item		Page	Original	Modified
Volume 1	7.1 JIS 8bit character code	34	Whole of section	No use in Maldives.

Section No. and item		Page	Original	Modified
Chapter 7	7.2 Universal multi-octet coded Character Set (UCS)	102	<ul style="list-style-type: none"> - Table 7-19 Code Values for Added Symbols Set - Table 7-20 Revision to Table 7-19: Modification of code values of Additional Symbols Set to comply with JIS X0213:2004 - 7.2.1.2 Supplemental characters (Gaiji) 	No use in Maldives. For Maldivian localized character set. See Table A8-1-2.
		105	7.2.2 Coding of control code The control codes available to this standard are limited to 0x007F (DEL); 0x000D and 0x000A (CR/LF); and 0x0009 (TAB).	See “7.1.2 Coding of control function” and Tables 7-14, 7-15, 7-16, and 7-17.
		105	7.2.3 Character encoding scheme	Adding descriptions about UTF-8. <ul style="list-style-type: none"> - No use “Byte Order Mark”. - C0 control codes (0x00 – 0x1F) are 0x0000 – 0x001F in UTF-8. - C1 control codes (0x80 – 0x9F) are 0xC280 – 0xC29F in UTF-8.
	7.3 Shift-JIS Character Codes	105	Whole of section	No use in Maldives.

Table A8-1-2 Character set for Maldives (See Table A8-1-1 Column 7.2 Universal multi-octet coded Character Set (UCS))

U+0021	U+002D	U+0039	U+0045	U+0051	U+005D	U+0069	U+0075	U+00A4	U+00BC	U+0787	U+0793	U+079F
!	-	9	E	Q	l	i	u	¤	¼	ހ	ސ	ނ
U+0022	U+002E	U+003A	U+0046	U+0052	U+005E	U+006A	U+0076	U+00A5	U+00BD	U+0788	U+0794	U+07A0
"	.	:	F	R	^	j	v	¥	½	ވ	ރ	ބ
U+0023	U+002F	U+003B	U+0047	U+0053	U+005F	U+006B	U+0077	U+00A7	U+00BE	U+0789	U+0795	U+07A1
#	/	;	G	S	_	k	w	§	¾	މ	ބާ	ޅ
U+0024	U+0030	U+003C	U+0048	U+0054	U+0060	U+006C	U+0078	U+00A9	U+00D7	U+078A	U+0796	U+07A2
\$	0	<	H	T	`	l	x	©	×	ޅ	ސ	ހ
U+0025	U+0031	U+003D	U+0049	U+0055	U+0061	U+006D	U+0079	U+00AB	U+00F7	U+078B	U+0797	U+07A3
%	1	=	I	U	a	m	y	«	÷	ޅ	ބާ	ހ
U+0026	U+0032	U+003E	U+004A	U+0056	U+0062	U+006E	U+007A	U+00AE	U+0780	U+078C	U+0798	U+07A4
&	2	>	J	V	b	n	z	®	÷	ސ	ބާ	ނ
U+0027	U+0033	U+003F	U+004B	U+0057	U+0063	U+006F	U+007B	U+00B0	U+0781	U+078D	U+0799	U+07A5
'	3	?	K	W	c	o	{	°	ރ	ޅ	ހ	ފ
U+0028	U+0034	U+0040	U+004C	U+0058	U+0064	U+0070	U+007C	U+00B1	U+0782	U+078E	U+079A	U+07A6
(	4	@	L	X	d	p	|	±	ސ	ސ	ހ	ަ
U+0029	U+0035	U+0041	U+004D	U+0059	U+0065	U+0071	U+007D	U+00B5	U+0783	U+078F	U+079B	U+07A7
)	5	A	M	Y	e	q	}	μ	ސ	ސ	ނ	ާ
U+002A	U+0036	U+0042	U+004E	U+005A	U+0066	U+0072	U+007E	U+00B6	U+0784	U+0790	U+079C	U+07A8
*	6	B	N	Z	f	r	~	¶	ސ	ސ	ނ	ާ
U+002B	U+0037	U+0043	U+004F	U+005B	U+0067	U+0073	U+00A2	U+00B7	U+0785	U+0791	U+079D	U+07A9
+	7	C	O	[	g	s	¢	·	ސ	ސ	ނ	ާ
U+002C	U+0038	U+0044	U+0050	U+005C	U+0068	U+0074	U+00A3	U+00BB	U+0786	U+0792	U+079E	U+07AA
,	8	D	P	\	h	t	£	»	ސ	ސ	ނ	ާ

Table A8-1-2 Character set for Maldives (Cont.)

U+07AB	U+2047	U+20A9	U+20B5	U+2151	U+215D	U+216A	U+217A	U+21D0	U+25BC	U+2611	U+2661	U+266E
ྐ	??	₩	₣	⅓	⅝	XI	xi	⇐	▼	☑	♡	♣
U+07AC	U+2048	U+20AA	U+20B6	U+2152	U+215E	U+216B	U+217B	U+21D1	U+25BD	U+2612	U+2662	U+266F
ྑ	?!	ℳ	₤	⅒	⅞	XII	xii	⇑	▽	☒	◇	#
U+07AD	U+2049	U+20AB	U+20B7	U+2153	U+2160	U+2170	U+2190	U+21D2	U+2600	U+2613	U+2663	U+26C4
ྒ	!?	₠	₡	⅓	I	i	←	⇒	☀	✕	♣	🐼
U+07AE	U+20A0	U+20AC	U+20B8	U+2154	U+2161	U+2171	U+2191	U+21D3	U+2601	U+2614	U+2664	U+26C5
ྒྷ	₧	€	₢	⅔	II	ii	↑	↓	☁	☂	♠	🌨
U+07AF	U+20A1	U+20AD	U+20B9	U+2155	U+2162	U+2172	U+2192	U+21D4	U+2602	U+261C	U+2665	U+26C6
ྔ	℥	₹	₪	⅕	III	iii	→	⇔	☂	👉	♥	🌧
U+07B0	U+20A2	U+20AE	U+20BA	U+2156	U+2163	U+2173	U+2193	U+21D5	U+2603	U+261D	U+2666	U+26C7
ྕ	₯	₦	₴	⅔	IV	iv	↓	↕	🐼	👉	♦	🐼
U+FDFF	U+20A3	U+20AF	U+2103	U+2157	U+2164	U+2174	U+2194	U+21D6	U+2604	U+261E	U+2667	U+26C8
﷞	₰	₯	°C	⅔	V	v	↔	↘	✂	👉	♣	🌩
U+2018	U+20A4	U+20B0	U+2109	U+2158	U+2165	U+2175	U+2195	U+21D7	U+2605	U+261F	U+2669	
‘	£	₱	°F	⅔	VI	vi	↕	↗	★	👉	♪	
U+2019	U+20A5	U+20B1	U+2116	U+2159	U+2166	U+2176	U+2196	U+21D8	U+2606	U+2639	U+266A	
’	₹	₱	№	⅓	VII	vii	↘	↙	☆	☹	♪	
U+201C	U+20A6	U+20B2	U+2121	U+215A	U+2167	U+2177	U+2197	U+21D9	U+260E	U+263A	U+266B	
“	₱	₱	TEL	⅔	VIII	viii	↗	↘	☎	😊	♪	
U+201D	U+20A7	U+20B3	U+2122	U+215B	U+2168	U+2178	U+2198	U+25B2	U+260F	U+263B	U+266C	
”	₱	₱	TM	⅓	IX	ix	↘	▲	☎	😊	♪	
U+203C	U+20A8	U+20B4	U+2150	U+215C	U+2169	U+2179	U+2199	U+25B3	U+2610	U+2660	U+266D	
!!	₱	₱	⅓	⅔	X	x	✓	△	□	♠	♭	

A8-2 Modifications for subtitle and superimposed characters

The details of the modifications from ARIB STD-B24 necessary for subtitle and superimposed characters are shown in Table A8-2.

Table A8-2 Modifications from ARIB STD-B24 (Subtitle and superimposed characters)

Section No. and item	Page	Original	Modified
Volume 1 Part 3 4 Presentation function of caption and superimpose Table 4-1: Presentation function of caption	142	Kanji, hiragana, katakana, symbol, alphanumerical, Greece characters, Russian characters, ruled line, DRCS	Characters defined in UTF-8 character code
Volume 1 Part 3 5.2 Character set	144	Standard character set should be kanji, hiragana, katakana, symbol, alphanumeric, Greece characters, Russian characters, box drawing, and DRCS.	Character set defined in UCS should be used.
Volume 1 Part 3 5.5 Character coding	144	For character coding, 8bitcode shall be used.	For character coding, UTF-8 character code shall be used.
Volume 1 Part 3 5.6 Control code	144	Control code used for caption is in compliance with Volume 1, Part 2 of this standard.	Control code used for caption is in compliance with Annex A8-1 in this document.
Volume 1 Part 3 9.3.1 Table 9-8: Character coding	155	Reserved for UCS	UCS

Annex 9 Interactive channel

There is no amendment to ABNT NBR 15607-1.

Annex 10 EWBS

There is no amendment to ISDB-T Harmonization Document PART 3: Emergency Warning Broadcast System (EWBS).

(NOTE) The “ISDB-T HARMONIZATION DOCUMENT PART 3: Emergency Warning Broadcast System” doesn’t correspond to Maldivian “Country code”. Japan is ready to propose the modifications to include the Maldivian “Country code” as shown in the table below for the next ISDB-T International Forum.

Country name (English short name)	Alpha-3 code	Country code (24bits)
Maldives	MDV	0100 1101 0100 0100 0101 0110

Appendix

Operational Guideline

Appendix1 Transmission

Operational guideline of transmission should be referred to ABNT NBR 15608-1 with the modifications as follows.

- Delete or ignore all the descriptions of VHF
- Replace DQPSK with QPSK

For more detail, please refer to the table AP1-1.

Concerning the channel planning described in the above document, coverage parameters can be defined by Maldives based on other materials: The recommendation ITU-R BT.1368 is one of the useful materials for the planning criteria. The recommendation ITU-R BT.2036 is also useful for a reference receiving system.

Available parameters according to hierarchical transmission mode should be referred to the table AP1-2.

Table AP1-1 Modifications from ABNT NBR 15608-1

Section No. and item	page	Original	modified
5.2 Frequency assignment	4	tables 2, 3, 4, 5 and 6	Table A1-3 8 MHz/ch UHF channels
		table2 -VHF Channels	N/A
		table4-High VHF channels	N/A
	5	table 5 14ch-69ch	21-48 ch
6.1 Outline	7	6.1 Outline DQPSK or 16QAM is employed	QPSK or 16 QAM is employed
6.2.1 Multiplexing ...	7	6.2.1, DQPSK is preferable ...	Deleted
	8	table8	Ignore DQ and DQPSK
6.3 channel-coding...	12	DQPSK	QPSK
	13-16	Figure7, 8, 9 and 10 DQPSK	QPSK
8.3.1 Broadcasting...	19	0.3ppm	0.2 ppm
9.4.3 Data arrangement...	38	d) EXEMPLO DQPSK	QPSK
10 Transmission...	42	Table 30 Delay time	Delay time values are to be replaced to the ones multiplied by 6/8.

Section No. and item	page	Original	modified
11.5 Example of link budget	57	Table42 DQPSK 1/2: 6.2 2/3: 7.7 3/4: 8.7 5/6: 9.6 7/8: 10.4	QPSK 1/2: 4.9 2/3: 6.6 3/4: 7.5 5/6: 8.5 7/8: 9.1
	58	Table43 DQPSK Data rate	QPSK All data rate are to be replaced to the one multiplied by 8/6.

Table AP1-2 Available Parameters According to Hierarchical Transmission Mode

Patterns	Layer	Layer Name	Number of segments	Transmission (See Table AP1-3)
(1)	A	Low Protection Layer	13	a
(2)	A	Low Protection Layer	13	b
(3)	A	High Protection Layer	1 (Partial reception)	c
	B	Low Protection Layer	12	a
(4)	A	High Protection Layer	8 to 2	b
	B	Low Protection Layer	5 to 11	a
(5)	A	High Protection Layer	1 (Partial reception)	c
	B	Low Protection Layer	12	b
(6)	A	High Protection Layer	1 (Partial reception)	c
	B	Middle Protection Layer	7 to 1	b
	C	Low Protection Layer	5 to 11	a

(Note) With regard to combinations of transmission parameters, Type c of transmission mode shall take transmission parameters with an equal or lower CN ratio than Type b of transmission mode and Type b of transmission mode shall take transmission parameters with a lower CN ratio than Type a of transmission mode. The required CN ratios are shown in Table 42 of ABNT NBR 15608-1 modified according to the table AP1-1. For example, if layer A in (5) uses 16QAM and 1/2, layer B may use only 16QAM and 1/2, or 16QAM and 2/3 as shown in Type b in Table AP1-3 as modulation and error correction parameters.

Layers: A, B and C represent layers described in the TMCC signal.

Layer name: The name of the layer used in Hierarchical transmission described in ABNT NBR 15608-3.

The services provided by the layers to which transmission mode (Type a), transmission mode (Type b) and transmission mode (Type c) shown in Table AP1-2 are respectively applied may be called the “fixed service”, “mobile service” and “portable service”, respectively.

No digital audio service will be provided.

Table AP1-3 Transmission Parameters

Type	Mode ^(Note 1)				Guard Ratio ^(Note 1)				Time Interleave ^(Note 2)				Modulation and Error Correction															
													64QAM						16QAM						QPSK			
	1	2	3		1/4	1/8	1/16	1/32	l=0	l=1	l=2	l=4	7/8	5/6	3/4	2/3	1/2	7/8	5/6	3/4	2/3	1/2	7/8	5/6	3/4	2/3	1/2	
a	X	X	O	O	O	O	O	X	X	O	O	O	O	O	O	O	O	X	X	X	X	O	O	X	X	X	X	1/2
b	X	X	O	O	O	O	O	X	X	O	O	O	O	X	X	X	X	X	X	X	X	O	O	X	X	X	O	O
c	X	X	O	O	O	O	O	X	X	O	O	O	O	X	X	X	X	X	X	X	X	X	O	O	X	X	O	O

O: Transmission parameters that can be used

X: Transmission parameters that cannot be used

Note 1: The mode and guard ratio are specified and applied to all layers and they cannot be individually specified for each layer.

Note 2: The use of "no time interleaving (l=0)" shall be restricted even in fixed reception, considering the tolerance to pulse noise.

Appendix2 Video Coding

The operational guideline of video coding should be referred to ABNT NBR 15608-2. However video coding parameters for full-seg services are applied to any layers except for the partial reception layer.

Appendix3 Audio Coding

The operational guideline of audio coding should be referred to ABNT NBR 15608-2. However audio coding parameters for full-seg services are applied to any layers except for the partial reception layer.

Appendix4 Multiplexing

The operational guideline of multiplexing should be referred to ABNT NBR 15608-3.

Appendix5 Service Information

Operational guideline of service information should be referred to ABNT NBR 15608-3 with the modifications as shown in Table AP5-1.

AP5-1 Modifications from ABNT NBR 15608-3

Section No. and item	Page	Original	Modified
2 Normative references	1	ABNT NBR 15606-2, Digital terrestrial television	Deleted
5.1 Coding table	3	The PSI/SI table coding, including tis descriptors adheres to ISO/IEC 8859-15, as shown in Table 1.	The PSI/SI table coding, including tis descriptors adheres to UTF-8, as shown in Appendix 8. Table1, 2 and 3 should be ignored.
	4	For caption strings and data packages coding, the coding table and the control characters shown in Table 2 should be used.	For caption strings and data packages coding, the coding table and the control characters shown in Appendix 8 should be used.

Section No. and item	Page	Original	Modified
	4	Furthermore, in caption string coding, it is recommended that the special G3 characters shown on Table 3 be used as specified in ABNT NBR 15606-1. Since the G3 special characters are attributed hexadecimal values coincident with the character map defined by ISO/IEC 8859-15, for correct decoding, it is recommended that each G3 special characters value be preceded by the control code <SG3> (0x1D).	Deleted
Table 28 — Attribution of component_tag values	22	<ul style="list-style-type: none"> - 0x40 to 0x6F : Mono media and objects carousel - 0x70 to 0x7F : Events messages and data carousel (DII and DDB) 	<ul style="list-style-type: none"> - 0x40 to 0x7F : Mono media - 0x40 to 0x7F : Events messages and data carousel (DII and DDB)
Table 30 — ES for transmission in different layers from that intended for partial reception	25	<ul style="list-style-type: none"> - MPEG-4 AAC Audio (48kHz) - Mono-media Component tag value : 0x40 to 0x6F - Objects carousel - Event messages and data carousel (DII and DDB) Component tag value : 0x70 to 0x7F 	<ul style="list-style-type: none"> - MPEG-4 AAC Audio - Mono-media Component tag value : 0x40 to 0x7F - Deleted - Event messages and data carousel (DII and DDB) Component tag value : 0x40 to 0x7F
19.2 Local_offset_time_descriptor configuration	31-32	<ul style="list-style-type: none"> -BRA -0x425241 -UTC-3 -Brazilian 	<ul style="list-style-type: none"> -MDV -0x4D4456 -UTC+5 - Maldivian
Table 35 — Details of TOT sections	32	<ul style="list-style-type: none"> - UTC-3 - official Brazilian time - ="BRA"=0x425241 - See Table 36 	<ul style="list-style-type: none"> - UTC+5 - official Maldivian time - ="MDV"=0x4D4456 - =0
Table 36 – Sections of the local_offset_time_descriptor	33	Table 36	Deleted

Section No. and item	Page	Original	Modified
21.2 Additional specification concerning data components Table 39	37	<ul style="list-style-type: none"> - data_component_id 0x0007 Ginga_XML base multimedia coding - data_component_id 0x00A4 Ginga - Application executing engine - data_component_id 0x00A3 Ginga - Application - data_component_id 0x00A0 Ginga - Application executing engine information table 	<ul style="list-style-type: none"> • data_component_id 0x000C A profile BML (for Home TV) • data_component_id 0x000D C profile BML (for One-seg)
Table 44 - Data structure of the data content descriptor	41	"por"=0x706F72 (defines the language used in "text char")	"eng"=0x656E67 or "div"=0x646976 can be used
23.5 Operating rules for transmission Table 49	46	<ul style="list-style-type: none"> - 0011: 480p - 0100: 480i - 0111: 288p - 1001 up to 1111: video_encode_format (extended) 	<ul style="list-style-type: none"> - 0011: 480p or 576p - 0100: 480i or 576i - 0111: Reserved - 1001 up to 1011: Reserved - 1100 up to 1111: video_encode_format (extended)
29.5.1 SDTT Data structure	60	The identification should be made using the prefixes defined by ANATEL.	Deleted
29.9.1.6 Band width	71	<ul style="list-style-type: none"> -0.25/0.38 quantity -0,25 used segment -10x1024x1024x8/(351.07x1000) =238,94 s -The bandwidth of the network of 1 segment is 1 404,29 Kbit/s -1404,29x0,25=351,07 [Kbits/s] -86400/238,94/2=180,8 times 	<ul style="list-style-type: none"> -0.18/0.28 quantity -0.18 used segment -10x1024x1024x8/(337.03x1000) =248.90 s - The bandwidth of the network of 1 segment is 1 872.39 kbit/s -1872.39x0.18=337.03 [kbits/s]. Note that the bandwidth limitation is 0.35207 Mbit/s as described above in order to keep consistency with 6 MHz countries about the bandwidth limitation. -86400/248.9/2=173.5 times
29.9.5 Daylight saving time operations (SDTT method)	78	Brazilian time (UTC-3)	Maldivian time (UTC+5)
31.2 Affiliation_id	83	The affiliation_id field allows identifying which network (Globo, SBT, Record, Band, RedeTV, etc.) a broadcaster belongs.	The affiliation_id field allows identifying which network a broadcaster belongs.

Section No. and item	Page	Original	Modified
31.2 Affiliation_id	83	For standardization of affiliation_id value, the characters codes shown in Table 76 should be used in order to generate the affiliation_id value for each network. The mains TV networks and your affiliation_id are shown in Table 80.	Deleted
31.2 Affiliation_id	83	Table 80	Deleted
31.2 Affiliation_id	83	The networks that are not listed in Table 80 should request the affiliation_id value to the SBTVO Forum.	Deleted

Appendix6 Receiver

The operational guideline on receiver should be based on “ISDB-T HARMONIZATION DOCUMENT PART 1: HARDWARE” (at least mandatory and recommended items) (Note). Guard interval mask characteristics should be referred to the recommendation ITU-R BT.2036. Any other items should be in accordance with the Chapter 6 of the main body.

(Note) The “ISDB-T HARMONIZATION DOCUMENT PART 1: HARDWARE” doesn’t correspond to 8MHz system. Japan is ready to propose the modifications to include 8MHz system for the next ISDB-T International Forum.

Appendix7 Security Issues

The operational guideline on Security Issues should be in accordance with the Chapter 7 of the main body.

Appendix8 Data broadcasting

Operational guideline of BML data broadcasting, subtitle and superimposed characters coding should be in accordance with ARIB TR-B14 Vol.3 “DIGITAL TERRESTRIAL TELEVISION BROADCASTING Specifications for Data Broadcasting Operations”.

There are some modifications for the Maldivian guideline as shown in the Table AP8-1. Data broadcasting guideline is referred also in Service Information guideline in point of data_component_descriptor. See Appendix 5 for the details.

Table AP8-1 Modifications from ARIB TR-B14

Section No. and item	Page	Original	Modified
3 Definitions	3-2	- 8-bit character encoding - DRCS - EUC-JP	Deleted Deleted UTF-8
	3-3	- Kana-Kanji conversion	Deleted
1.2.1 Table 1-2 Presentation restrictions on the screen plane	3-16	- MPEG-2 - MPEG-1 - 8-bit character codes including (*)EUC-JP - 8-bit character codes	H.264 Deleted UTF-8 UTF-8.
1.2.3 Table 1-4 Overview of restriction conditions for mono-media encoding presented in each screen plane	3-21	- MPEG-2 - Stream format identification = 0x02 - MPEG-1 - 8-bit character codes(*) Including EUC-JP	- H.264|MPEG-4 AVC - Stream format identification = 0x1B - Deleted - UTF-8
1.2.4 Table 1-5 Audio playing function	3-25	- AAC-LC - Audio PES; Stream format identification = 0x0F - 48kHz,32kHz	- MPEG4-AAC standard - Audio PES; Stream format identification = 0x11 - 48 kHz,44.1 kHz
1.2.5 Table 1-6 Fonts	3-25	Character type	See Annex8 Table A8-1-2 for Character set for Maldives
1.4.2 Table 1-9 Type and capacity of BproNV	3-27	Whole of Table	The number of affiliations has been fixed as 24.
1.6 Character entry function	3-28	Functions not defined in this document such as the kana kanji conversion function are implementation dependent.	Deleted
1.6.1 Table 1-12 "character type" attribute	3-30	- hankaku - zenkaku - katakana - hiragana	- Deleted - Deleted - Deleted - Deleted
1.6.1 Function specifications	3-30	EUC-JP encoding	UTF-8 encoding
1.6.2 Table 1-14 character type	3-32	- 2 byte characters	- Deleted
1.6.3 Kana Kanji conversion function	3-32	Whole of section	Deleted
3.1.1 MPEG-1 Video	3-80	Whole of section	Deleted
3.1.2 MPEG-2 Video	3-80	Whole of section	Deleted
3.1.3 MPEG-4 Visual	3-85	Encoding methods using MPEG-4 Visual are not operated.	Adding H.264|MPEG-4 AVC operation. Details in ABNT NBR 15608-2.
3.3.1 MPEG-2 AAC	3-88	Whole of section	Deleted

Section No. and item	Page	Original	Modified
3.3.2 AIFF-C	3-89	Whole of section	Deleted
3.3.3 MPEG-4 Audio	3-89	Audio encoding method using MPEG-4 is not operated.	Adding MPEG4-AAC operation. Details in ABNT NBR 15608-2.
3.3.6.2 Simultaneous playable encoding method	3-90	- AAC-LC	- MPEG-4 AAC
3.4 Character encoding	3-91	Whole of section	No use in Maldives
Volume 3 Section 2 4.2.8.7 Data Contents Descriptor Table 4-10 Setup parameters of the Data Content Descriptor for caption	3-107	Fixed to jpn(Japanese).	"eng"=0x656E67 or "div"=0x646976 can be used
Volume 3 Section 2 4.4.1 Character codes	3-109	The character encoding method used for caption/superimpose is 8-bit character codes.	The character encoding method used for caption/superimpose is UTF-8 character code.
Volume 3 Section 2 4.4.3 Character size control	3-109	Restrictions related to character display are stipulated in Table 4-14	Deleted
Volume 3 Section 2 4.4.3 Character size control Table 4-14 Area of coding group that can be used for specification of display format and specification of character size controls	3-110	Whole table	Deleted
Volume 3 Section 2 4.4.3 Character size control	3-111	Whole of paragraph (1)	
Volume 3 Section 2 4.4.3 Character size control	3-111	(2)	Deleted
Volume 3 Section 2 4.5.1 Control codes	3-123	Control codes used in caption are in compliance with ARIB STD-B24 Vol. 1 Part 2, 7.1.2.	Control codes used in caption are in compliance with Annex A8-1 in this document

Section No. and item	Page	Original	Modified
Volume 3 Section 2 4.5.2 Operation of flashing	3-132	Flashing of the 8-bit character codes character string does the character flashing	Flashing string ("FLC") of the UTF-8 enables the character flashing
Volume 3 Section 2 4.6 Operation of the DRCS	3-135 3-136	Whole section	Deleted
5.2 Operation of NVRAM	3-142	able 5-1 NVRAM used in Digital Terrestrial Television Broadcasting	The maximum number of Affiliations and Networks in one broadcasting area should be set as 24. See Table AP8-2 as the exact list of NVRAM when using the number of 24.
5.5 Operation of character codes	3-159	Refer to ARIB STD-B24 Vol. 2 Appendix 2 "4.1. Character codes".	UTF-8
5.5.1 Transmission of DRCS pattern data	3-159	Whole of section	Deleted
5.6 Operation area of media type and mono-media	3-160	charset='euc-jp'	charset='UTF-8'
5.7.3 Table 5-9 Operational guidelines relating to the attributes of elements	3-164	- Fixed to "ja" - Fixed to "EUC-JP" - ... and type attribute is either "audio/X-arib-aiff" or "audio/X-arib-mpeg2-aac".	- Fixed to "dv" - Fixed to "UTF-8" - ... and type attribute is "audio/X-arib-mpeg4-aac".
5.11 Presentation control of BML document	3-175	- "video/X-arib-mpeg1" or "video/X-arib-mpeg2" - "audio/X-arib-mpeg2-aac"	- "video/X-arib-H264-high" - "audio/X-arib-mpeg4-aac"
5.14.6.6 Interaction channel function-TCP/IP	3-201 3-202	EUC-JP	UTF-8
5.14.6.12 External character function	3-209	Whole of section	Deleted
5.14.8 Operation guideline for transmission of communication contents	3-215 ~3-220	- ja - audio/X-arib-mpeg2-aac - audio/X-arib-aiff - application/X-arib-drscs - EUC-JP	- dv - audio/X-arib-mpeg4-aac - Deleted - Deleted - UTF-8
Appendix 5-1 DTD	3-280	EUC-JP	UTF-8
1 Introduction	3-301	MPEG-2 AAC	MPEG-4 AAC
3.2.4 Table 3-6 Desired audio mono-media to be presented	3-310	- MPEG-2 AAC - stream format identifier = 0x0F - Sampling frequency 24kHz, 48kHz	- MPEG-4 AAC - stream format identifier = 0x11 - Sampling frequency 32 kHz, 44.1 kHz, 48 kHz

Section No. and item	Page	Original	Modified
3.2.5 Table 3-7 Fonts	3-310	- Kanji (level 1, 2) - Hirakana - Katakana	- Deleted - Deleted - Deleted
3.4.2 Table 3-10 Type and capacity of BproNV	3-313	- 288KB(12 affiliations x 24KB)	The number of affiliations has been fixed as 24.
3.6.3 Character types	3-314	- refer to ARIB STD-B24, Vol. 1, Part 2, 7.3 - Kanji	- refer to ARIB STD-B24, Vol. 1, Part 2, 7.2 (Refer Annex8 A8-1) - Deleted
3.6.4 Kana Kanji conversion function	3-314	Whole of section	Deleted
4.1.2.4 Configuration of the ES transmitted by 1 service	3-330	MPEG-2 AAC	MPEG-4 AAC
4.1.5.1 Receiver operation at the beginning of data broadcasting	3-333	Moreover, Playback is executed as an audio stream of MPEG-2 AAC (sampling frequency = 24KHz) if the component of the component_tag=0x83 or 0x84 is included. Similarly, Playback is executed out as an audio stream of MPEG-2 AAC (sampling frequency = 48KHz) if the component of the component_tag=0x85 or 0x86 is included.	Moreover, Playback is executed as an audio stream of MPEG-4 AAC (sampling frequency = 48 kHz) if the component of the component_tag=0x83 or 0x84 is included. Similarly, Playback is executed out as an audio stream of MPEG-4 AAC (sampling frequency = 44.1 kHz) if the component of the component_tag=0x85 or 0x86 is included. Similarly, Playback is executed out as an audio stream of MPEG-4 AAC (sampling frequency = 32 kHz) if the component of the component_tag=0x90 or 0x91 is included.
5.1.1 H.264|MPEG-4 AVC	3-355	Whole of section	Details in ABNT NBR 15608-2.
5.3.1 MPEG-2 AAC	3-369	Whole of section	MPEG-4 AAC Follows ABNT NBR 15608-2
5.3.5 Audiosynthesis of receiver units	3-371	MPEG-2 AAC	-MPEG-4 AAC
5.4 Character codes	3-372	- 5.4.1 8-bit character codes for C-profile - 5.4.2 Shift JIS	- Deleted - 5.4.1 UTF-8

Section No. and item	Page	Original	Modified
Volume 3 Section 4 6.2.4 Operation of closed caption management data Table 6-3: Closed caption management data parameters	3-376	Used language code ("jpn" fixed)	Used language code ("eng"=0x656E67 or "div"=0x646976 can be used)
Volume 3 Section 4 6.4.1 Character entity	3-379	Whole sentences and Table 6-2	Deleted
Volume 3 Section 4 6.4.1 Character entity	3-379		The character encoding method used for closed caption is UTF-8 character code. Control code range is from 0x0000 to 0x001F (inclusive) and from 0xC280 to 0xC29F (inclusive).
Volume 3 Section 4 6.5 Control code used in closed caption	3-381	The control code used in the closed caption is compliant with ARIB STD-B24, Vol. 1, Part 2, 7.1.2.	The control code used in the closed caption is compliant with Annex A8-1 in this document.
7.2 Operation of NVRAM in Digital Terrestrial Television C-profile broadcasting	3-388	Table 7-1 NVRAM used by Digital Terrestrial Television C-profile broadcasting	The maximum number of Affiliations and Networks in one broadcasting area should be set as 24. See Table AP8-3 as the exact list of NVRAM when using the number of 24.
7.5 Operation of character coding schemes	3-393	See ARIB STD-B24, Vol. 2, Appendix 4, "4.1. Character Coding Schemes".	Using UTF-8
7.7.1 Declaration of XML and DOCTYPE	3-393	Shift_JIS	UTF-8
7.7.3 Table 7-5 Operations for attributes of elements	3-397	- Shift_JIS - audio/X-arib-mpeg2-aac	- UTF-8 - audio/X-arib-mpeg4-aac
7.9 extended property specification	3-414	- Refer to the ARIB STD-B24, Vol. 1, Part 2, Chapter 7, 7.3 "Shift-JIS character codes" - Kanji set	- Refer to ARIB STD-B24, Vol. 1, Part 2, 7.2 (Refer Annex8 A8-1) - Deleted
7.10.7 Extended function provided by digital terrestrial broadcasting (2)	3-447	- tokyo_dgree - tokyo_dms	- Deleted - Deleted

Section No. and item	Page	Original	Modified
7.12.6.1 Table 7-27 Attribute operation related to stream presentation	3-465	audio/X-arib-mpeg2-aac	audio/X-arib-mpeg4-aac

Table AP8-2 NVRAM usage for Maldivian A-profile Data broadcasting
(See Table AP8-1 Column 5.2 Operation of NVRAM)

Type	Meaning	NVRAM amount
A-profile memory area for all the broadcasters	Common area available for use by all terrestrial digital broadcasters.	2 KB (Fixed length block of 64bytes * 32)
A-profile memory area for the affiliation	Common area available for use by broadcasters that belong to the same system.	•4 KB for one Affiliation (Fixed length block of 64 bytes * 64) •Number of systems: more than 24
A-profile memory area for the specified broadcaster	Area occupied by each broadcaster	•4 KB for one broadcaster (Fixed length block of 64bytes * 64) •Number of broadcasters that should be secured by receiver units simultaneously: more than 24
A-profile memory area of communication purpose for the specified broadcaster	Area to share information with broadcasting contents and communication contents	•2 KB for 1 broadcaster. (Fixed length block of 64bytes *32) •Number of broadcasters that should be secured by receiver simultaneously: more than 24
Memory area for bookmark service	Area available to use for the bookmark service	•Total of more than 50 blocks of variable length block with maximum of 320 bytes.
Memory area for root CA certificates	Area to store root CA certificate of general purpose transmitted by carousels in memory.	•3 KB for one certificate •Quantity : 8
Memory area for registration transmission	Area to store messages that carry out registration transmission	•More than 3 blocks of variable length block with maximum of 1.5 KB.

Table AP8-3 NVRAM usage for Maldivian C-profile Data broadcasting (See Table AP8-1 Column 7.2 Operation of NVRAM in Digital Terrestrial Television C-profile broadcasting)

Class	Purpose	Capacity of NVRAM
Digital Terrestrial Television C-profile area for the affiliation	Area used commonly by operators belonging to the same affiliation area	<ul style="list-style-type: none"> • 24 KB per affiliation (64 byte fixed block * 384) • 8 KB out of 24 KB is for inner affiliation common area, and the remaining 16 KB is divided by 8 and used as the individual operator area. • Affiliation number: 24 affiliations
TVlink area	Area used for TVlink service	<ul style="list-style-type: none"> • Maximum of 256 bytes variable block • Writable block number: 50 or more

Appendix9 Interactive channel

The operational guideline on the Interactive channel should be in accordance with the Chapter 9 of the main body.

Appendix10 EWBS

The operational guideline on EWBS should be in accordance with the Chapter 10 of the main body.

If there is a TV broadcaster not operating the EWBS, the TV receivers tuned to that channel cannot receive the EWBS signal. Therefore it is required that all broadcasters should operate the EWBS.

Area codes in Maldives are as follows.

AP10-1 Area code

For the EWBS application purpose, receivers should pre-store the area code allocation table. In accordance with ABNT15603, area code uses a 12-bit string, with the left bit first, as shown in Fig AP10-1

Fig AP10-1 12-bit string for area code

b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
-----	-----	----	----	----	----	----	----	----	----	----	----

AP10-2 Actual allocation table

The actual allocation table of area code in Maldives is shown in Table AP10-1.

Table AP10-1 Area code allocation Table

Common	Province	Atoll	Area Code (Binary)	Area Code (Decimal)
National	National		000001100100	100
	Upper North Province		000011001000	200
		HA	000011001001	201
		HDh	000011001010	202
		Sh	000011001011	203
	North Province		000100101100	300
		N	000100101101	301
		R	000100101110	302
		B	000100101111	303

Common	Province	Atoll	Area Code (Binary)	Area Code (Decimal)
		Lh	000100110000	304
	North Central Province		000110010000	400
		Male	000110010001	401
		K	000110010010	402
		AA	000110010011	403
		ADh	000110010100	404
		V	000110010101	405
	Central Province		000111110100	500
		M	000111110101	501
		F	000111110110	502
		Dh	000111110111	503
	South Central Province		001001011000	600
		Th	001001011001	601
		L	001001011010	602
	Upper South Province		001010111100	700
		Ga	001010111101	701
		GdH	001010111110	702
	South Province		001100100000	800
		Gn	001100100001	801
		S	001100100010	802

Appendix 11 Outline of operational parameters

Some operation parameters for Maldivian digital terrestrial television broadcasting are shown in Table AP11-1

Table AP11-1

Item		Contents
DTTB system		ISDB-T system
Operating channel		470–694 MHz (channels 21 to 48)
Channel bandwidth	Full-seg	7.6 MHz
	One-seg	0.58 MHz
Central carrier frequency		474 –690
Transmission mode		Mode 3
Guard Interval ratio		1/4, 1/8, 1/16
Carrier Modulation	Full-seg	QPSK, 16 QAM, 64 QAM
	One-seg	QPSK, 16 QAM
Error Correction (Inner Code)		Convolutional Code (Coding Rate: 1/2, 2/3, 3/4, 5/6 or 7/8)
Error Correction (Outer Code)		(204,188) Reed-Solomon Code
Interleave	Full-seg	Frequency and Time Interleave
	One-seg	Time interleaving length: I=1,2 or 4
Video Coding		H.264|MPEG-4 AVC (ISO/IEC 14496-10)
Video profile	Full-seg	Up to HP @ L4.0
	One-seg	Up to BP @ L1.3
Video format	Full-seg	576i, 576p, 720p, 1080i, 1080p
	One-seg	SQVGA, QVGA, CIF
Video frame rate	Full-seg	25, 50fps
	One-seg	5, 10, 12, 15, 24, 25, 30fps
Audio Coding		MPEG-4 AAC (ISO/IEC 14496-3)
Audio Profile	Full-seg	LC AAC @L2, L4 HE-AAC+SBR v.1 @ L2, L4
	One-seg	HE-AAC+SBR+PS v.2 @ L2
Audio sampling frequency	Full-seg	48 kHz, 44.1 kHz
	One-seg	48 kHz, 44.1 kHz, 32 kHz (AAC sampling frequency: 24 kHz, 22.05 kHz, 16 kHz)
Multiplexing		MPEG-2 Systems (ISO/IEC 13818-1)
Data Broadcasting		BML
EWBS		ISDB-T Harmonization Document PART 3

Bibliography

(ITU Recommendation)

<http://www.itu.int/en/publications/Pages/default.aspx>

(ISO/IEC standards)

http://www.iso.org/iso/home/store/catalogue_tc/catalogue_tc_browse.htm?commid=45316

(ARIB Standards)

http://www.arib.or.jp/english/html/overview/sb_ej.html

The versions of ARIB Standards referred in the Maldivian ISDB-T Standards are as follows.

Standrd		Version
Number	Title	
ARIB STD-B24	Data Coding and Transmission Specification for Digital Broadcasting	5.2
ARIB STD-B31	TRANSMISSION SYSTEM FOR DIGITAL TERRESTRIAL TELEVISION BROADCASTING	2.2
ARIB TR-B14	OPERATIONAL GUIDELINES FOR DIGITAL TERRESTRIAL TELEVISION BROADCASTING	3.8

(ABNT Standards)

<http://forumsbtvd.org.br/acervo-online/normas-brasileiras-de-tv-digital/>

The versions of ABNT Standards referred in the Maldivian ISDB-T Standards are as follows.

Standrd		Version
Number	Title	
ABNT NBR 15601	Digital terrestrial television – Transmission system	2007
ABNT NBR 15602-1	Digital terrestrial television – Video coding, audio coding and multiplexing Part 1: Video coding	2007
ABNT NBR 15602-2	Digital terrestrial television – Video coding, audio coding and multiplexing Part 2: Audio coding	2007
ABNT NBR 15602-3	Digital terrestrial television – Video coding, audio coding and multiplexing Part 3: Signal multiplexing systems	2007
ABNT NBR 15603-1	Digital terrestrial television – Multiplexing and service information (SI) Part 1: SI for digital broadcasting systems	2008
ABNT NBR 15603-2	Digital terrestrial television – Multiplexing and service information (SI) Part 2: Data structure and definitions of basic information of SI Descriptors:	2009
ABNT NBR 15603-3	Digital terrestrial television – Multiplexing and service	2009

	information (SI) Part 3: Syntaxes and definitions of extension information of SI Descriptors:	
ABNT NBR 15604	Digital terrestrial television – Receivers	2007
ABNT NBR 15605-1	Digital terrestrial television — Security issues Part 1: Copy control	2009
ABNT NBR 15607-1	Digital terrestrial television — Interactive channel Part 1: Protocols, physical interfaces and software interfaces	2011
ABNT NBR 15608-1	Digital terrestrial television – Operational guideline Part 1: Transmission system – Guide for implementation of ABNT NBR 15601:2007	2008
ABNT NBR 15608-2	Digital terrestrial television – Operational guideline Part 2: Video coding, audio coding and multiplexing – Guideline for implementation of ABNT NBR 15602:2007	2010
ABNT NBR 15608-3	Digital terrestrial television — Operational guideline Part 3: Multiplexing and service information (SI) – Guideline for implementation of ABNT NBR 15603:2007	2012

(ISDB-T Harmonization Document)

<http://www.dibeg.org/techp/aribstd/harmonization.html>